DOCUMENT RESUME

ED 437 069 IR 057 605

AUTHOR	Small, Ruth V.; Arnone, Marilyn P.
TITLE	Evaluating Web Sites: A Critical Information Skill.
PUB DATE	1999-11-00
NOTE	7p.; In: Unleash the Power! Knowledge - Technology - Diversity: Papers Presented at the Third International Forum on Research in School Librarianship, Annual Conference of the International Association of School Librarianship (IASL) (28th, Birmingham, AL, November 10-14, 1999); see IR 057 588.
PUB TYPE	Reports - Research (143) -- Speeches/Meeting Papers (150)
EDRS PRICE	MF01/PC01 Plus Postage.
DESCRIPTORS	*Educational Theories; Elementary Secondary Education; Evaluation Criteria; *Evaluation Methods; Higher Education; Information Literacy; Information Skills; Material Development; *Motivation; Validity; *World Wide Web
IDENTIFIERS	Electronic Resources; *Web Sites

ABSTRACT

The evaluation of World Wide Web resources has become a critical information skill for students. Because of the uniqueness of these resources, new tools are required that assess not only the content validity and mechanical functionality of a Web site, but also its motivational quality. This paper describes the development and validation of a set of Web evaluation tools, the Website Motivational Analysis Checklist (WebMAC), designed for use by students in grades 1-12, that are based on motivation theory and provide multiple feedback mechanisms. Research questions included: What motivation theory or theories are most appropriate as a basis for the comprehensive evaluation of Web sites? and Do the WebMAC instruments adequately and validly test the motivational quality of Web sites? A survey of the motivational literature was conducted to investigate the first question. A comprehensive, well-researched theory that could be adapted to the assessment of electronic environments (particularly Web sites) was sought. Formative evaluation methods that included iterative testing of the instruments were implemented with graduate and undergraduate students, educators, and children, while factor analyses were conducted to confirm the theoretical basis of the instrument. These provided evidence for the second question. (Contains 10 references.) (MES)

Reproductions supplied by EDRS are the best that can be made
from the original document.

PERMISSION TO REPRODUCE AND
DISSEMINATE THIS MATERIAL
HAS BEEN GRANTED BY

K. Haycock

TO THE EDUCATIONAL RESOURCES
INFORMATION CENTER (ERIC)

Evaluating Web Sites

A Critical Information Skill

Ruth V. Small, Ph.D.
<drruth@mailbox syr.edu>

Associate Professor
School of Information Studies, Syracuse University
United States of America

ED 437 069

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)
☐ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

Marilyn P. Arnone, Ph.D.

President, New Product Research and Development
Creative Media Solutions, Syracuse, New York
United States of America

The evaluation of Web resources has become a critical information skill for students. Because of the uniqueness of these resources, new tools are required that not only assess the content validity and mechanical functionality of a Web site, but also its motivational quality. This paper describes the development and validation of a set of Web evaluation tools (Website Motivational Analysis Checklist: WebMAC), designed for use by students in grades 1-12, that are based on motivation theory and provide multiple feedback mechanisms.

Introduction

Just as with the growth of print resources, as the number of electronic resources continues to escalate, the need to evaluate those resources increases in importance. The evaluation of networked information resources, such as Web sites, requires new tools that encompass a broader concept of evaluation, In addition to the appropriateness and authenticity of content and soundness of the design, other evaluation criteria include such issues as currency and coverage (Alexander & Tate, 1998). Furthermore, assessing the functionality of the various mechanisms of a site to identify technical problems and improve user control and Web site consistency is important (Nielsen, 1994).

A number of evaluation instruments (e.g. Caywood, 1998; Schrock, 1997) have been developed to help library media specialists and teachers judge the suitability of a Web site for their instructional needs. Some focus heavily on content validity issues while others focus on functionality issues. While these issues are extremely important, there is another issue that has

IR057605

BEST COPY AVAILABLE

largely been ignored by other instruments; i.e. the *motivational quality* of a Web site. Motivational quality refers to the site's ability to motivate users to visit, engage, and return to it. Furthermore, most Web site evaluation instruments are designed for use by adults; few are created for independent use by students or as a tool for teaching students a structured method for evaluating Web sites. Finally, few instruments have detailed scoring mechanisms that allow visual analysis and interpretation for improving the site.

Until now, there have been no Web site evaluation instruments that both focus on motivational quality (how well the site attracts and engages the user) and are designed for use by both students and educators. *The Website Motivational Analysis Checklist (WebMAC)*© is a series of 7 instruments, five of which are designed for use in education contexts. *WebMAC Senior* (Small & Arnone, 1998), a 32-item instrument, was designed to be used with students in grades 9 and up. All other instruments were adapted from *WebMAC Senior*. *WebMAC Junior* (Arnone & Small, 1999), a 16-item instrument is targeted toward students in grades 1-4. Two other versions of *WebMAC Junior*, *WebMAC Investigator* (Arnone & Small, 1999) a 12-item instrument and *WebMAC Junior---Long Form* (Arnone & Small, 1998), a 24-item instrument, are also available for this level. *WebMAC Middle* (Small & Arnone, 1998), a 24-item instrument, is intended for students in grades 5-8;

All of these instruments emphasize motivational quality while including functionality and content validity items, framed in terms of their effect on motivation. These instruments differ from other Web site evaluation instruments because they are (1) theoretically based, (2) user-centered, (3) use a research approach, and (4) allow feedback for improvement from multiple viewpoints (Nielsen, 1994).

Research Questions

This evaluation study documents the creation and testing of these Web site evaluation instruments and describes their potential applications in instruction. Research questions include:

1. What motivation theory(ies) are most appropriate as a basis for the comprehensive evaluation of Web sites?
2. Do the *WebMAC* instruments adequately and validly test the motivational quality of Web sites?

Methodology

A survey of the motivational literature was conducted to investigate Research Question #1. A comprehensive, well-researched theory that could be adapted to the assessment of electronic environments (particularly Web sites) was sought. Formative evaluation methods that included iterative testing of the instruments were implemented with educators and children while factor analyses were conducted to confirm the theoretical basis of the instrument. These provided evidence for Research Question #2.

Results

Research Question #1

A survey of the motivation literature revealed one long standing, well-researched theory that appeared to be both highly applicable to and comprehensive for the evaluation of Web sites. Expectancy-value (E-V) theory (e.g. Vroom, 1964) states that motivation is defined by the type and amount of effort an individual exerts on a task. It further specifies two prerequisites to effort: value and the expectation for success. Both prerequisites must be met for effort (motivation) to result.

While E-V theory has been widely supported in research on motivation in the work environment, it is only recently that this theory has been applied to research on motivation in electronic environments. For example, Burton et al. (1992-1003) and Snead and Harrell (1994) found E-V theory a useful theoretical framework for studying motivation in evaluation of expert systems and of electronic decision support systems.

E-V theory forms the theoretical basis for the *WebMAC* instruments described in this paper; i.e., the degree to which both value and expectation for success are attained comprises the motivational quality of a Web site. Value is defined in terms of two attributes---how stimulating and how meaningful the Web site is to the user. Expectation for Success is also defined in terms of two attributes---how organized and how easy-to-use the Web site is for the user.

The *WebMAC* instruments use Likert-type items (strongly agree-strongly disagree; not applicable) for evaluating a Web site. "Not Applicable" items are further scored in relation to their appropriateness for that site.

Examples of Value and Expectation for Success items from *WebMAC Senior* are:

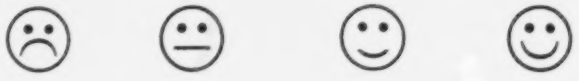
> 9. This Web site is fun and interesting to explore. (Value: Stimulating)
>
> 16. Navigating this Web site does not require any special skills or experience. (Expectation for Success: Easy-to-Use)

WebMAC Middle uses the same format as *WebMAC Senior* but uses simpler language and slightly different ratings (definitely agree - do NOT agree). There is no "Not Applicable" designation. Examples of Value and Expectation for Success items from *WebMAC Middle* are:

> 19. The information at this Web site is useful to me. (Value: Meaningful)
>
> 10. There is a menu or site map that helps me understand how much and what kinds of information I will find there. (Expectation for Success: Organized)

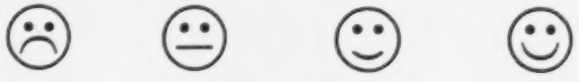
The *WebMAC Junior* items use smiley faces (excellent-very poor) to represent response choices. It does not break items down into the four attributes but simply categorizes items by Value and Expectation for Success. An example of Value and Expectation for Success items from *WebMAC Junior* are:

1. When you first arrived at this Web site, did it look like this would be an interesting or fun Web site to explore? (Value)



0 1 2 3

2. Was it easy to find your way around the different parts of this Web site? (Expectation for Success)



0 1 2 3

After completing the scoring of all items on a *WebMAC* instrument, the student transfers scores to the appropriate E-V category columns and totals scores. Totaled scores are plotted on scoring graphs and grids for quick visual assessment of the strengths and weaknesses of the site and comparison among evaluations.

Research Question #2:

More than 100 students and educators have participated in iterative testing and validation of these instruments during the past two years. Initial testing focused on *WebMAC Senior* since it was the first instrument developed and the other instruments were adapted from it.

A group of 23 graduate students was asked to independently evaluate an assigned Web site using a 60-item *WebMAC Senior*. Items were randomly ordered to prevent clustering and categorization. Analysis focused on the distribution of item scores. Items with a wide spread of scores (set at 1.00+ standard deviation) were either revised or eliminated, resulting in a 40-item instrument.

Two additional tests of the 40-item *WebMAC Senior* were conducted in which 34 graduate and undergraduate students were observed as they evaluated one of two pre-selected Web sites that were considered moderately motivating. They provided qualitative feedback on each item and on the overall instrument. Finally, the instrument was administered to 226 graduate and undergraduate students who were asked to assess the same Web site. Factor analyses were conducted to verify clustering of items into proposed categories, resulting in the final 32-item instrument.

The original *WebMAC Junior* (24-item) and *WebMAC Middle* (32-item) instruments were reviewed by 21 educators for clarity, comprehensibility, and face validity, resulting in minor modifications. *WebMAC Junior* was subsequently tested with ten children in a formative evaluation conducted by the producers of a nationally-televised children's television program. Information about individual items was collected to determine how children understood and

interpreted each question. Additional observations and focus group interviews yielded rich qualitative data and provided a more in-depth understanding of children's attitudes toward the instrument.

Finally, a large-scale pilot test was conducted on *WebMAC Junior*, with over 500 students (grades 1-4) participating in testing the instrument. As a result, the wording of several items was modified and the shorter, 16-item instrument was created. Factor analyses on the results will be conducted and reported. Based on the results of testing the other *WebMAC* instruments, *WebMAC Middle* was modified to a 24-item instrument.

The *WebMAC* instruments are currently being used by educators around the world. *WebMAC Senior* has been translated into Portuguese for use in Brazil and *WebMAC Junior* has been translated into Japanese and Portuguese. In addition, the instrument has been used in more than 40 schools and colleges across the United States. Complete background information, descriptions, the instruments, their scoring and administration directions, and stories of implementation in a variety of contexts are contained in our books, "Motivation Mining: Using Evaluation Skills to Find Web Treasures(Grades 1-6) and "Motivation Mining: Using Evaluation Skills to Find Web Treasures (Grades 7-12), available this fall from Linworth Publishing, Inc.

References

Alexander, J., & Tate, M. (1998). Teaching Web evaluation. *Internet Trend Watch for Libraries., 3* (2), Librarians and Educators Online.

Arnone, M.P., and Small, R.V. (1999). *WebMAC Investigator.*© The Motivation Mining Company, Fayetteville, NY.

Arnone, M.P., and Small, R.V. (1999). *WebMAC Junior.*© The Motivation Mining Company, Fayetteville, NY.

Arnone, M.P., and Small, R.V. (1998). *WebMAC Junior: Long Form.*© The Motivation Mining Company, Fayetteville, NY.

Burton, F.G., Chen, Y., Grover, V., & Stewart, K.A. (1993). An application of expectancy theory for assessing user motivation to utilize an expert system. *Journal of Management Information Systems, 9* (3), 183-198.

Caywood, C. (1998). *Library Selection Criteria for WWW Resources.* <http://www.pilot.infi.net/~carilyn/criteria.html>.

Nielsen, J. (1994). Heuristic evaluation. In J. Nielsen and R.L. Mack (Eds.). *Usability Inspection Methods.* New York: John Wiley & Sons.

Schrock, K. (1997). *Kathy Schrock's Guide for Educators: Critical Evaluation Surveys.* <http://www.capecod.net/schrockguide/eval.htm>.

Small, R.V., and Arnone, M.P. (1998). *WebMAC Middle*©. The Motivation Mining Company, Fayetteville, NY.

Small, R.V., and Arnone, M.P. (1998). *WebMAC Senior*©. The Motivation Mining Company, Fayetteville, NY.